A SYNOPSIS OF THE SPECIES OF ARCTIUM IN NORTH AMERICA.

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For some time it has been apparent that the burdocks found in waste land in various parts of eastern America do not fall readily into the two or three catagories provided for them in our current manuals. Field observations during the past summer, and study of the accumulated material in the Gray Herbarium and the Herbarium of the New England Botanical Club, show that we have, established in America, four species which are commonly recognized by Old World botanists as growing in Europe. The peculiarities of the achenes, corollas, involucral bracts, and leaves, which are emphasized in European handbooks, so regularly accompany characteristic arrangements of the heads in the inflorescence, that upon the combination of these characters it is possible to classify all but the most immature material which has been examined.

As judged from the conclusions of European authors, the species of this genus hybridize rather freely, and therefore in this country we should expect occasional more or less intermediate hybrid forms. But as yet so little attention has been given to the genus in America that we are unable to state to what extent our own plants hybridize.

Plants with leaves somewhat laciniate or coarsely toothed have been reported from time to time as forms of *A. Lappa*, *A. minus* and *A. tomentosum*. One of the earliest records in America of such a variation was in Darlington's Flora Cestrica (1837) where Darlington said: "A variety has been observed here, occasionally, with pinnatifid leaves" (p. 436). Specimens collected by Darlington have nondescript inflorescences and on his label he states that "The inflorescence always has a kind of half-starved or semi-abortive appearance." A similar form has recently been described in an unsigned note in The American Botanist (xv. 83, 1909) as *A. minus* f. *laciniatum*, in which the "inflorescence was irregular with numerous small sterile flowers." The plants of this general character that we have seen have all the appearance of being teratological developments caused by some disturbing influence, and hardly merit special taxonomic treatment.

On account of certain obvious characteristics of the burdocks most

collectors are inclined to ignore them, and from this it follows that little material finds its way into the public herbaria. We are therefore unable to state full ranges for any of the species; but by the citation of characteristic specimens examined it is hoped that the following synopsis may be made more readily intelligible.

A. Heads corymbose, long-peduncled: leaf-blades round-ovate, obtuse; petioles strongly angular, deeply furrowed.

Petioles solid: *heads very large and broad*, 3–4.5 cm. in diameter;[1] *involucre glabrous*, green (rarely purple): *outermost bracts about* 1 *cm. long*; *the middle and inner* slightly longer, *subequal and exceeding the corollas*; *the innermost with pale firm slender gradually attenuate tips*: broad upper portion of corolla shorter than the slender tube: *achenes* 6–7 mm. long, *fawn-color*, often dark-mottled, *slightly rugose below the crenate-bordered summit*. . . . . 1. *A. Lappa*.

Petioles hollow: *heads smaller*, 2–2.7 cm. broad: *involucre* more or less *arachnoid*: *outermost bracts* 4–7 *mm. long*; *the middle and inner successively longer*, all or all but the inner conspicuously *shorter than the corollas*; *the innermost with membranous more or less colored blunt or cuspidate tips*: broad upper portion of the corolla as long as the tube: *achenes* 4.5–7 mm. long, *gray*, usually dark-mottled, *rugulose from base to the entire summit*. . . . . 2. *A. tomentosum*.

B. Heads racemose or subracemose, rarely long-peduncled: leaf-blades ovate-oblong, usually less obtuse; petioles slightly angular.

Petioles hollow: heads medium, 2.5–3.5 cm. broad: involucre glabrous or arachnoid, green or purplish: outermost *bracts* short, 5–7 mm. long; *the middle and inner* successively much longer, *equaling or exceeding the corollas*; the innermost long-attenuate, firm and aristate: upper and lower portions of the corolla equal in length: *achenes* 5.5–7.5 mm. long, *dark-brown*, sometimes light-mottled, not rugulose, the summit entire. . . . . 3. *A. nemorosum*.

Petioles hollow: heads small, 1.5–2.5 cm. broad: involucre glabrous or arachnoid, green or purplish: the outer *bracts* short; *the middle and inner* successively much longer, all *conspicuously shorter than the corollas*; the innermost attenuate, firm and aristate: upper and lower portions of the corolla equal in length: *achenes* 5–6 mm. long, *gray or ashy-brown*, usually dark-mottled, smooth or faintly rugulose, the summit entire. . . . . 4. *A. minus*.

1. A. Lappa L. Sp. Pl. 816 (1753). *Arctium majus* Bernh. Syst. Verz. Erfurt. 154 (1800). *Lappa officinalis* All. Fl. Ped. i. 145 (1785). *Lappa major* Gaertn. Fruct. ii. 379 (1791). *Arctium Lappa*, var. *majus* Gray, Syn. Fl. i. pt. 2, 397 (1878).— Typical specimens examined. New Brunswick: dry roadside, Four Falls, Aug-

[1] These measurements of the heads include the spreading tips of the bracts.

ust 14, 1901 (*B. L. Robinson*). MAINE: roadside, Houlton, August 12, 1909 (*Fernald & Wiegand, Fernald*, no. 2269). NEW HAMPSHIRE: Tamworth, September 6, 1903 (*F. S. Collins*); Walpole, August 4, 1900 (*Noyes and Fernald*, no. 380); near dwellings, Jaffrey, July 29, 1897 (*B. L. Robinson*, no. 298). VERMONT: roadside, Westmore, July 26, 1896 (*E. F. Williams*). MASSACHUSETTS: Malden, July 31, 1887 (*F. S. Collins*); Sherborn, August 3, 1909 (*Miss M. L. Loomis*); waste land, Boston, August 11, 1898 (*E. F. Williams*). CONNECTICUT: Plainville, August 31, 1904 (*L. Andrews*).

The typical form of this species has an involucre which is green throughout.

Var. **purpurascens** (LeGrand) n. comb. *Lappa major*, sub-var. *purpurascens* LeGrand, Bull. Assoc. franc. Bot. ii. 69 (1899).—Involucre strongly suffused with purple.—Typical specimen examined from VERMONT: roadside, Cornwall, August 22, 1900 (*E. Brainerd*).

2. A. TOMENTOSUM Mill. Gard. Dict. ed. 8 (1768). *Arctium Lappa* β, L. Sp. Pl. 816 (1753). *A. Bardana* Willd. Sp. Pl. 1632 (1804). *A. Lappa*, var. *tomentosum* Gray, Synop. Fl. I, pt. 2, 397 (1878), at least as to synonyms. *Lappa tomentosa* Lam. Fl. Fr. ii. 37 (1778).—Typical specimens. MASSACHUSETTS: vacant lot, corner Parker Street and Buckingham Street, Cambridge, July 9, 1886 and July 28, 1908 (*Walter Deane*); waste ground, Cambridge, August 30, 1908 (*C. A. Weatherby*, no. 3); field where rubbish had formerly been dumped, Westford, July 12 and 21, 1909 (*Miss E. F. Fletcher*). CONNECTICUT: waste ground, Naugatuck, July 19, 1908 (*A. E. Blewitt*, no. 16).

3. A. NEMOROSUM Lejeune in Lejeune & Courtois, Comp. Fl. Belg. iii. 129 (1836). *A. intermedium* Bab. Man. Brit. Bot., ed. 8, 202 (1881).

This species is very variable and seems to occur with us in three pronounced forms which, owing to the need of further observations in the field and of clearer understanding of the Old World variations, it seems wisest to treat for the present without names. The condition in Europe is somewhat as follows. In many European manuals, in addition to the four species here treated, a fifth is given which is said to differ from *A. nemorosum* in having long-peduncled larger heads with the involucre more open above and more or less arachnoid. This is the *A. intermedium* of Lange (Dansk. Fl. ed. 1, 463, 1851), *A. pubens* of Babington (Ann. & Mag. Nat. Hist. ser. 2, xvii. 376, 1856), *Lappa intermedia* of Reichenbach (Icon. Fl. Germ. xv. 54, t. 812, 1853) also of Lange (Fl. Dan. t. 2663, 1861), and *A. majus*, sub-sp. *nemorosum* of Rouy and Foucaud (Fl. Fr. ix. 95, 1905). The exact status of this fifth species, however, is very confused, both as to whether it is distinct

from *A. nemorosum* and as to just what forms the authors of *A. nemorosum*, *pubens*, and *intermedium* had in mind when these names were published. The confusion in Great Britain, especially, is well summed up by Beeby in the Journ. Bot. xlvi. 380–382 (1908), who concludes after a study of authentic specimens of Lange's *A. intermedium*, that his species, so far as those specimens are concerned, consists of two forms: "first, a rather large-headed form of *A. minus* corresponding to var. *purpurascens* Blytt," and "secondly, the hybrid *A. majus* × *minus*." Beeby, in his study of the genus *Arctium*, also obtained a presumably authentic specimen of *A. nemorosum* collected by Lejeune himself and found it to be a form with heads agglomerated and almost sessile, rather than long-peduncled, and therefore agreeing both with the original description and also with the interpretation of most recent authors except Rouy & Foucaud. He says "I very much doubt whether we have any fourth species [in Great Britain] to support the name *A. pubens* Bab. If so, I am unacquainted with it, though I believe that Messrs. Groves are satisfied of the existence of such a plant."

Among our American forms the one here treated as *A. nemorosum*, form *a* agrees most closely with what the type is supposed to be. The form *c*, on the other hand, agrees fairly well with the description of *A. intermedium* Lange and *A. pubens* Bab.; but considering the doubt in the minds of European authors as to the exact status of these names and also the fact that, in America at least, the form here called form *b* combines characters of both form *a* and form *c*, it seems unwise at present to attribute any names whatever to the three forms here described. Whether they are really distinct forms, and what relation they bear to the above names cannot be determined with our present inadequate knowledge.

(*a*) Heads sessile or subsessile, the uppermost tending to be clustered: involucre glabrous to slightly arachnoid. — Typical specimens. Maine: around dwellings, Orono, September, 1889 (*Fernald*). New Hampshire: near dwellings, Jaffrey, July 27, 1897 (*B. L. Robinson*). Massachusetts: Springfield, August 17, 1904 (*L. Andrews*). Rhode Island: Providence, September 19, 1899 (*J. R. Churchill*). Connecticut: roadside, Southington, August 25, 1904 (*L. Andrews*). Illinois: waste places, St. Clair Co., August 14, 1893 (*H. Eggert*). Kansas: woods, Riley Co., August 24, 1895 (*J. B. Norton*, no. 307).

(*b*) Heads scattered and peduncled: involucre glabrous or essentially so. — Typical specimens. Quebec: vicinity of Cap à L'Aigle, July 27, 1905 (*J. Macoun*, no. 68,237). Maine: Pembroke, July 23, 1909 (*Fernald & Wiegand*); Manchester, September 9, 1873 (*F. L. Scribner*).

(*c*) Heads scattered and peduncled: involucre copiously arachnoid.—Typical specimens. MAINE: Fort Fairfield, August 9, 1909 (*Fernald & Wiegand*); Dover, September 1, 1894 and August 28, 1896 (*Fernald*); North Berwick, September 5, 1894 (*J. C. Parlin*). MASSACHUSETTS, Stockbridge, August 23, 1902 (*R. Hoffmann*).

4. A. MINUS (Hill) Bernh. Syst. Verz. Erfurt. 154 (1800). *Lappa minor* Hill, Veg. Syst. iv. 28 (1762). *A. Lappa*, var. *minus* Gray, Syn. Fl. i. pt. 2, 397 (1878). Typical specimens. MAINE: Houlton, August 12, 1909 (*Fernald & Wiegand*); Rumford, 1887 (*J. C. Parlin*); Hanover, September 10, 1889 (*J. C. Parlin*); East Auburn, August 27, 1896 (*E. D. Merrill*, no. 556); North Berwick, August 31, 1894 (*J. C. Parlin*). NEW HAMPSHIRE: Walpole, August 4, 1900 (*Fernald*, no. 377); VERMONT: Manchester, July 12, 1898 (*M. A. Day*, no. 104). MASSACHUSETTS: Malden, August 8, 1886 (*F. S. Collins*); Cambridge, August 30, 1908 (*C. A. Weatherby*, no. 2); Oak Island, Revere, August 20, 1882 (*H. A. Young*); Boston, August 17, 1866 (*Wm. Boott*); Blue Hills, September 1, 1895 (*W. H. Manning*). ONTARIO: Ottawa, August 4, 1894 (*J. Macoun*).

NOTES ON PELTANDRA, RAFINESQUE.

IVAR TIDESTROM.

(Plate 83.)

During the season of 1904, while searching for aquatic and marsh plants at Cameron Run, near Alexandria, Virginia, I noticed a number of *Peltandrae* in the marsh adjoining the creek. There appeared to be two distinct forms and I naturally supposed the second form to be *P. sagittifolia*, but upon examination the dark green seed disproved my supposition. The difference between the two forms was very marked: the one was robust having ample leaves and a rather large head of fruit, while the other was slender, its leaves narrow-oblong and its head of fruit much smaller. It is true that the leaf-form in many if not in all of our *Araceae*, is very variable, and that even on a single plant we may find leaf-outlines ranging between the maximum and the minimum for that species; yet in the case of our *Peltandrae* there are characters upon which we may possibly recognize two or three long since forgotten forms.